

What is claim d is:

1. A method for measuring flow by means of an ultra sonic flow meter, the method comprising the steps of transmitting an ultra sonic signal in an upstream and a downstream direction, initiating a time measurement at a starting time upon receipt of the ultra sonic signal, and stopping the time measurement at a stopping time

making a first series of transmissions where the starting time in each transmission is incremented or decremented until a time difference (Δt) between the upstream and downstream signal is inside a reference band (Δt_{span}), and calculating the flow based on the time measurements.

2. A method according to claim 1, including the further step of generating a second series of transmissions following the first transmissions, where the starting time in each transmission is incremented or decremented until the time period (DS_RUNUP) between the starting time (DS_START) and the stopping time (DS_STOP) is approximately equal to a multiple of half the time period of the ultra sonic signal, but preferably equal to the time period.

3. A method according to claim 2, including the further step of generating a third series of transmissions following the first and second series incrementing or decrementing, the starting time in the third series of transmissions until a difference between a calculated average transmission time and a transmission time reference value determined on the basis of the media temperature is inside a reference band.

4. A method according to claim 3, wherein the incrementation or decrementation during the third series of transmissions is done in steps of a timely resolution (t_{sig}) that is approximately equal to the period of the received signal.

5. A method according to claim 1, wherein the incrementation or decrementation is done in steps of a timely resolution (t_{res}) defined by the resolution of the microcontroller.
6. A method according to claim 1, wherein following the starting time, the time measurement is stopped at a first positive zero crossing of the received ultra sonic signal or at a first negative zero crossing.
7. A method according to claim 1, wherein following the starting time, the time measurement is stopped at a first positive zero crossing following a negative zero crossing of the received ultra sonic signal, or vice versa.
8. A method according to claim 1, wherein the starting time in the first transmission in the first series of transmissions is a fixed value (DS_START_INI).
9. A method according to claim 1, wherein the reference band (Δt_{span}) is delimited by a maximum difference time (Δt_{max}) and a minimum difference time (Δt_{min}), the width of the band being smaller than the time period (t_{sig}) of the ultra sonic receive signal.
10. A method according to claim 9, wherein a safety margin is added to the reference band, the safety margin corresponding to at least the timely resolution (t_{res}) of the incrementing or decrementing steps, and preferably the sum of a resolution and the duration of a timing noise (t_n).